Alternatives Analysis

Nearly 50 alternatives were analyzed for their potential to meet the study goals and objectives.

Selection of Alternatives

For purposes of the study, the term *alternative* is used to mean *a choice between two or more things or among those things to be chosen.* The term is not meant to indicate a completely different choice of methods from those currently used by Caltrans. The vegetation management alternatives discussed include methods currently used, modifications of current methods, and new methods not currently used.

A broad range of nearly 50 vegetation management alternatives was compiled through research and consultation with various groups and organizations. University and independent studies, product literature, and trade publications were reviewed and analyzed. Several "brainstorming sessions" on vegetation management strategies and methods were attended by RVMC representatives, PALs representatives, technical experts, and Caltrans staff at various levels. Jones & Stokes Associates' staff traveled to the districts to observe conditions in each district and evaluate vegetation management challenges and methods with district staff.

The strategies used by other California state and local agencies, other state departments of transportation, and other organizations in dealing with these same challenges were explored as well. Because of environmental, geographical, and economic diversity, California presents more varied challenges than those confronting other states. However, many of the methods used in other states may be useful because the individual challenges they face are similar.

Study Methodology

An alternatives analysis process was developed for screening, evaluating, ranking, and determining the applicability of vegetation management strategies. Five systematic tables were devised for the alternatives analysis. The analysis tables were developed to provide fair and consistent relative rankings of the vegetation management alternatives as evaluated for their potential to address the study goals and objectives for meeting the statewide challenges. The tables were designed to be flexible and repeatable for use by Caltrans' staff to evaluate the best alternative on a segment-specific basis. The *Alternative Evaluation Form* is condensed from the alternatives analysis and allows design, maintenance, and planning staff to evaluate the anticipated suitability of an alternative to a specific roadway segment or project. The relative importance of each objective may be weighted to address the specific needs of that particular district or project.

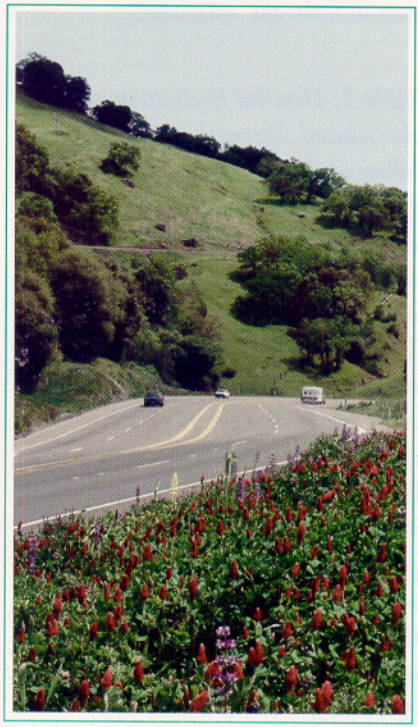

Table 1, *Initial Screening of the Alternatives,* poses each alternative against the question of whether it is indeed a prescribed vegetation management strategy, and further asks whether the alternative has the potential to address each of the six study objectives (increasing public safety, increasing worker safety, improving the environment, decreasing herbicide use, decreasing life cycle costs, and improving public perception of Caltrans' activities).

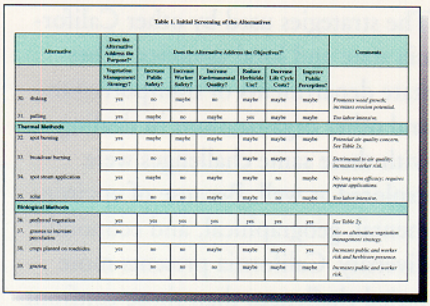

Table 1. Initial Screening of the Alternatives

Alternative	Does the Alternative Address the Purpose?	Does the Alternative Address the Objectives?						Comments
	Vegetation Management Strategy?	Increase Public Safety?	Increase Worker Safety?	Increase Environmental Quality?	Reduce Herbicide Use?	Decrease Life Cycle Costs?	Improve Public Perception?	
30. disking	yes	no	maybe	no	maybe	maybe	maybe	Promotes weed growth; increases erosion potential.
31. pulling	yes	maybe	no	maybe	yes	maybe	maybe	Too labor intensive.
Thermal Methods								
32. spot burning	yes	maybe	maybe	maybe	maybe	maybe	maybe	Potential air quality concern. See Table 2a.
33. broadcast burning	yes	no	no	no	maybe	maybe	no	Detrimental to air quality; increases worker risk.
34. spot steam application	yes	maybe	no	maybe	maybe	no	maybe	No long-term efficacy; requires repeat applications.
35. solar	yes	no	no	maybe	maybe	no	maybe	Too labor intensive.
Biological Methods								
36. preferred vegetation	yes	yes	yes	yes	yes	yes	yes	See Table 2y.
37. grasses to increase percolation	no							Not an alternative vegetation management strategy.
38. crops planted on roadsides	yes	no	no	maybe	maybe	maybe	yes	Increases public and worker risk and herbicide presence.
39. grazing	yes	no	no	no	maybe	maybe	maybe	Increases public and worker risk.

Table 2, *Detailed Evaluation of the Selected Alternative,* similarly followed the study objectives but gauged the potential of the alternative to address specific subcriteria under each objective, and assigned numerical values to the responses. The 17 subcriteria represent the major concerns under each general criterion; for example, public safety concerns are subdivided as visibility, health, fire, and traffic. The numerical value was multiplied by a weighted percentile to arrive at a relative percentage for each alternative, with 100 as the highest score. The weighted percentiles were determined by the RVMC as follows:

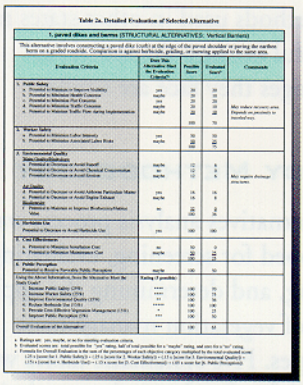

Table 2a. Detailed Evaluation of Selected Alternative

1. paved dikes and berms (STRUCTURAL ALTERNATIVES: Vertical Barriers)

This alternative involves constructing a paved dike (curb) at the edge of the paved shoulder or paving the earthen berm on a graded roadside. Comparison is against herbicide, grading, or mowing applied to the same area.

Evaluation Criteria	Does This Alternative Meet the Evaluation Criteria?a	Possible Score	Evaluated Scoreb	Comments
1. Public Safety				
a. Potential to Maintain or Improve Visibility	yes	30	30	
b. Potential to Minimize Health Concerns	maybe	20	10	
c. Potential to Minimize Fire Concerns	yes	25	25	
d. Potential to Minimize Traffic Concerns	maybe	20	10	Min reduce inclusive areas
e. Potential to Minimize Traffic Flow during Implementation	maybe	20	10	Depends on precision in installation.
		115	75	
2. Worker Safety				
a. Potential to Minimize Labor Intensity	yes	50	50	
b. Potential to Minimize Associated Labor Risks	maybe	50	25	
		100	75	
3. Environmental Quality				
Water Quality/Hydrology				
a. Potential to Decrease or Avoid Runoff	maybe	12	6	
b. Potential to Decrease or Avoid Chemical Contamination	no	12	0	
c. Potential to Decrease or Avoid Erosion	maybe	12	6	Min impacts drainage area/zones.
Air Quality				
d. Potential to Decrease or Avoid Airborne Particulate Matter	yes	14	14	
e. Potential to Decrease or Avoid Engine Exhaust	maybe	14	7	
Biodiversity				
f. Potential to Maintain or Improve Biodiversity/Habitat Value	no	24	0	
		100	33	
4. Herbicide Use				
Potential to Decrease or Avoid Herbicide Use	yes	100	100	
5. Cost Effectiveness				
a. Potential to Minimize Installation Cost	no	50	0	
b. Potential to Minimize Maintenance Cost	maybe	50	25	
		100	25	
6. Public Perception				
Potential to Result in Favorable Public Perception	maybe	100	50	
Using the Above Information, Does the Alternative Meet the Study Goals?c	Rating (5 possible)			
1. Increase Public Safety (25%)	****	100	75	
2. Increase Worker Safety (25%)	****	100	75	
3. Improve Environmental Quality (15%)	**	100	30	
4. Reduce Herbicide Use (15%)	*	100	100	
5. Provide Cost-Effective Vegetation Management (15%)	*	100	15	
6. Improve Public Perception (5%)	***	100	50	
Overall Evaluation of the Alternative	***	100	83	

a. Ratings are: yes, maybe, or no for meeting evaluation criteria.
b. Evaluated scores are: total possible for "yes" rating, half of total possible for a "maybe" rating, and zero for a "no" rating.
c. Formula for Overall Evaluation is the sum of the percentages of each objective category multiplied by the total evaluated score:
1.25 x [score for 1. Public Safety] + 1.25 x [score for 2. Worker Safety] + 1.15 x [score for 3. Environmental Quality] + 1.15 x [score for 4. Herbicide Use] + 1.25 x score for [5. Cost Effectiveness] + 1.05 x score for [6. Public Perception]

- increase public safety (25%)
- increase worker safety (25%)
- improve environmental quality (15%)
- reduce herbicide use (15%)
- provide cost-effective vegetation management (15%)
- improve public perception (5%)

Table 3, *Applicable Locations for Selected Alternative,* categorizes the corridor segment by ecoprovince, topography, adjacent development and land use, fire concerns, right-of-way location, adjacent roadway features, and climatic factors. An affirmative response indicates the general suitability of the alternative for the locational variables under each category.

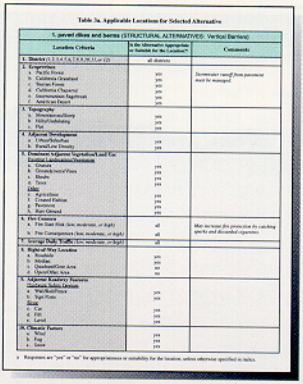

Table 4 is a *Summary of Alternatives Evaluation.* The table indicates the rank and score of each alternative, whether the alternative requires further testing, and a general comment about that particular alternative. An affirmative response for requiring further testing indicates that the alternative is suitable for a demonstration project, as discussed in the following section.

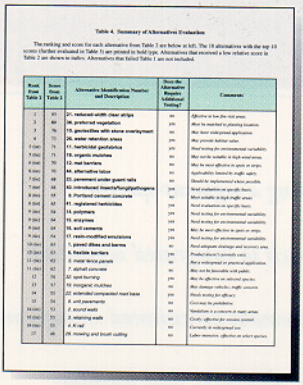

Table 5, *Alternative Cost Effectiveness and Efficacy Potential,* shows relative costs for installation and ongoing maintenance for each alternative over a 20-year life cycle period and the estimated percentage of herbicide reduction the alternative has the potential to achieve.